

Electrical Equipment in Hazardous Areas

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On October 14, 1913, one hundred years ago, the Senghenydd Colliery in Glamorgan, South Wales exploded resulting in 439 fatalities. This was the worst coal mine disaster in the history of the United Kingdom. The incident is believed to have been started by methane gas (“firedamp”) ignited by electric sparks from equipment, possibly an electric bell signal. The gas explosion disturbed coal dust in the mine, creating a coal dust cloud that ignited. The dust explosion raised still more coal dust and the explosions continued to propagate.



The Senghenydd explosion was one of the events that led to a recognition of the potential hazard of sparks from electrical equipment igniting a flammable vapor, dust, or mist cloud. One protective approach is the use of “intrinsically safe equipment.” This is defined as “equipment and wiring which is incapable of releasing sufficient electrical or thermal energy under normal or abnormal conditions to cause ignition of a specific hazardous atmospheric mixture in its most easily ignited concentration.” This is accomplished by specific design of the electrical equipment - for example by limiting the amount of power available to electrical equipment in a hazardous area to a level below that which will ignite the fuel mixture.

While a thorough discussion of electrical safety in a hazardous area is beyond the scope of the *Beacon*, there are some important things (see below) that you, as a plant operator or maintenance worker, can do to maintain the integrity of electrical equipment in areas which are classified as hazardous.



Monument to the victims of the Senghenydd disaster

What can you do?

- ➔ Understand the hazardous areas and electrical classification in your plant. If you have not seen electrical classification drawings for your area, ask for these, and make sure that they are up-to-date.
- ➔ Invite your plant electrical classification experts to give a safety meeting describing the hazardous areas in your plant. Ask them how to recognize electrical safety issues and problems that you might observe as you work.
- ➔ Focus one of your routine plant safety inspections on electrical safety. For example, look for damaged wiring or electrical connections, damaged electrical boxes, problems with gaskets, seals, inadequate air purge for an enclosure, or missing bolts on electrical enclosures.
- ➔ Be careful when bringing any electric equipment into a hazardous area, either yourself or when authorizing permits to work. Some examples: anything with an electric motor such as a portable pump, portable instruments, flashlights, communications devices, motor vehicles (including fork trucks, lift trucks, etc.). Ask about anything that must be plugged in or which needs a battery! Be certain that all equipment is acceptable for use in the specific hazardous area where you intend to use it. If you are not sure, get help from an expert who knows!
- ➔ Make sure that electrical safety in hazardous areas is addressed in Management of Change (MOC) reviews.

Understand electrical safety in your plant!

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